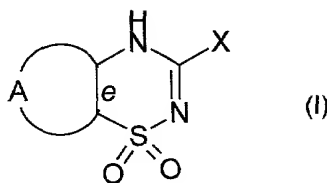


WHAT IS CLAIMED IS:

1. A process for the preparation of a compound of formula (I)



- 5 wherein

X is NR^2R^3 , SR^1 , S(=O)R^1 , $\text{S(=O)}_2\text{R}^1$ or OR^1 ;

- R^1 is hydrogen; C_{3-6} -cycloalkyl or $(\text{C}_{3-6}\text{-cycloalkyl})\text{C}_{1-6}\text{-alkyl}$, wherein the C_{3-6} -cycloalkyl group is optionally mono- or polysubstituted with C_{1-6} -alkyl, halogen, hydroxy or C_{1-6} -alkoxy; a 3-6 membered saturated ring system comprising one or more nitrogen-, oxygen- or sulfur atoms, optionally being mono- or polysubstituted with halogen, cyano, trifluoromethyl, C_{1-6} -alkyl, C_{1-6} -alkoxy, C_{1-6} -alkoxy- C_{1-6} -alkyl, aryl, arylalkyl, hydroxy, oxo, nitro, amino, C_{1-6} -monoalkyl or dialkylamino; straight or branched C_{1-18} -alkyl, C_{2-18} -alkenyl or C_{2-18} -alkynyl, wherein each of the groups is optionally mono- or polysubstituted with halogen, hydroxy, C_{1-6} -alkoxy, C_{1-6} -alkylthio, C_{3-6} -cycloalkyl, nitro, amino, C_{1-6} -monoalkyl- or dialkylamino, cyano, oxo, formyl, acyl, carboxy, C_{1-6} -alkoxycarbonyl, carbamoyl, formylamino, C_{1-6} -alkylcarbonylamino, aryl, aryloxy, arylalkoxy; or bicycloalkyl, aryl, heteroaryl, arylalkyl or heteroarylalkyl, wherein each of the groups is optionally mono- or polysubstituted with halogen, hydroxy, C_{1-6} -alkyl, C_{1-6} -alkoxy, aryloxy, arylalkoxy, nitro, amino, C_{1-6} -monoalkyl- or dialkylamino, cyano, oxo, acyl or C_{1-6} -alkoxycarbonyl;

R^2 is hydrogen; hydroxy; C_{1-6} -alkoxy; or C_{1-6} -alkyl, C_{3-6} -cycloalkyl, C_{2-6} -alkenyl or C_{2-6} -alkynyl optionally mono- or polysubstituted with halogen;

- R^3 is hydrogen; C_{3-6} -cycloalkyl or $(\text{C}_{3-6}\text{-cycloalkyl})\text{C}_{1-6}\text{-alkyl}$, wherein the C_{3-6} -cycloalkyl group is optionally mono- or polysubstituted with C_{1-6} -alkyl, halogen, hydroxy or C_{1-6} -alkoxy; a 3-6 membered saturated ring system comprising one or more nitrogen-, oxygen- or sulfur atoms; or straight or branched C_{1-18} -alkyl optionally mono- or polysubstituted with halogen, hydroxy, C_{1-6} -alkoxy, C_{1-6} -alkylthio, C_{3-6} -cycloalkyl, aryl, aryloxy, arylalkoxy, nitro, amino, C_{1-6} -monoalkyl- or dialkylamino, cyano, oxo, formyl, acyl, carboxy, C_{1-6} -alkoxycarbonyl, or carbamoyl; or

R^3 is $-OR^4$; $-C(=Z)R^4$; $-NR^4R^5$; or bicycloalkyl, aryl, heteroaryl, arylalkyl or heteroarylalkyl, optionally mono- or polysubstituted with halogen, hydroxy, C_{1-6} -alkyl, C_{1-6} -alkoxy, aryloxy, arylalkoxy, nitro, amino, C_{1-6} -monoalkyl- or dialkylamino, cyano, oxo, acyl or C_{1-6} -alkoxycarbonyl;

R^4 is hydrogen; C_{3-6} -cycloalkyl or $(C_{3-6}$ -cycloalkyl) C_{1-6} -alkyl, wherein the C_{3-6} -cycloalkyl group is optionally mono- or polysubstituted with C_{1-6} -alkyl, halogen, hydroxy or C_{1-6} -alkoxy; a 3-6 membered saturated ring system comprising one or more nitrogen-, oxygen- or sulfur atoms; or straight or branched C_{1-18} -alkyl optionally mono- or polysubstituted with halogen, hydroxy, C_{1-6} -alkoxy, C_{1-6} -alkylthio, C_{3-6} -cycloalkyl, aryl, aryloxy, arylalkoxy, nitro, amino, C_{1-6} -monoalkyl- or dialkylamino, cyano, oxo, formyl, acyl, carboxy, C_{1-6} -alkoxycarbonyl, or carbamoyl;

Z is O or S;

R^5 is hydrogen; C_{1-6} -alkyl; C_{2-6} -alkenyl; C_{3-6} -cycloalkyl optionally mono- or polysubstituted with C_{1-6} -alkyl, halogen, hydroxy or C_{1-6} -alkoxy; or

when R^3 is $-NR^4R^5$, R^4 and R^5 together with the nitrogen atom form a 3-12 membered mono- or bicyclic system, in which one or more of the carbon atoms may be exchanged with nitrogen, oxygen or sulfur, each of these ring systems optionally being mono- or polysubstituted with halogen, C_{1-6} -alkyl, hydroxy, C_{1-6} -alkoxy, C_{1-6} -alkoxy- C_{1-6} -alkyl, nitro, amino, cyano, trifluoromethyl, C_{1-6} -monoalkyl- or dialkylamino, or oxo; or

when X is $-NR^2R^3$, R^2 and R^3 together with the nitrogen atom form a 3-12 membered mono- or bicyclic system, in which one or more of the carbon atoms may be exchanged with nitrogen, oxygen or sulfur, each of these ring systems optionally being mono- or polysubstituted with halogen, C_{1-6} -alkyl, hydroxy, C_{1-6} -alkoxy, C_{1-6} -alkoxy- C_{1-6} -alkyl, nitro, amino, cyano, trifluoromethyl, C_{1-6} -monoalkyl- or dialkylamino or oxo;

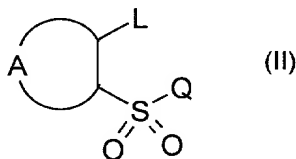
A together with the carbon atoms forming bond e of formula I represents a 5 membered heterocyclic system comprising one or more nitrogen-, oxygen- or sulfur atoms, the heterocyclic system optionally being mono- or polysubstituted with halogen; C_{1-18} -alkyl; C_{3-6} -cycloalkyl; hydroxy; C_{1-6} -alkoxy; C_{1-6} -alkoxy- C_{1-6} -alkyl; nitro; amino; cyano; cyanomethyl; perhalomethyl; C_{1-6} -monoalkyl- or dialkylamino; sulfamoyl; C_{1-6} -alkylthio; C_{1-6} -alkylsulfonyl; C_{1-6} -alkylsulfenyl;

C₁₋₆-alkylcarbonylamino; arylthio, arylsulfinyl, arylsulfonyl, aryl, arylalkyl, or aryloxy, wherein the aryl group is optionally mono- or polysubstituted with C₁₋₆-alkyl, perhalomethyl, halogen, hydroxy or C₁₋₆-alkoxy; C₁₋₆-alkoxycarbonyl; C₁₋₆-alkoxycarbonyl-C₁₋₆-alkyl; carbamyl; carbamylmethyl; C₁₋₆-monoalkyl- or dialkylaminocarbonyl; C₁₋₆-monoalkyl- or dialkylaminothio-
 5 carbonyl; ureido; C₁₋₆-monoalkyl- or dialkylaminocarbonylamino; thiocarbamyl; thioureido; C₁₋₆-monoalkyl- or dialkylaminothiocarbonyl- amino; C₁₋₆-monoalkyl- or dialkylaminosulfonyl; carboxy; carboxy-C₁₋₆-alkyl; acyl; formyl; or a 5 - 6 membered nitrogen, oxygen or sulfur containing ring, optionally substituted with C₁₋₆-alkyl or phenyl, wherein the phenyl group is optionally mono- or polysubstituted with C₁₋₆-alkyl, perhalomethyl, halogen, hydroxy or C₁₋₆-
 10 alkoxy; or

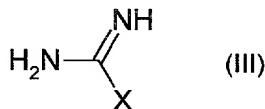
a salt thereof with a pharmaceutically acceptable acid or base, or an optical isomer thereof, or a tautomeric form thereof, or metabolites or prodrugs thereof,

15 comprising one of the following methods:

a) reacting a compound of formula (II)

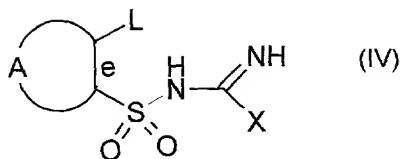


wherein A is as defined above, L is a leaving group selected from alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, nitro or halogen and Q is halogen, with a compound of formula
 20 (III),



wherein X is NR²R³, wherein R² and R³ are defined above, or a suitable salt thereof, in the presence of a base in solvent 1, to form a compound of formula (IV)

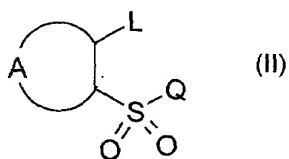
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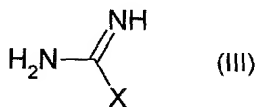
wherein A, L and X are as defined above, and

cyclizing the compound of formula (IV) in solvent 2, optionally in the presence of a base, and optionally with a metal catalyst, to form a compound of formula (I), or

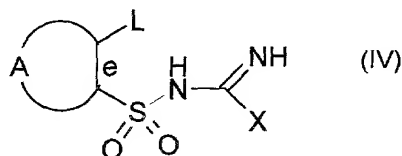
- 5 b) reacting a compound of formula (II)



wherein A is as defined above, L is a leaving group selected from alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl or halogen and Q is halogen, with a compound of formula (III),



- 10 wherein X is SR^1 , $S(=O)R^1$ or $S(=O)_2R^1$, wherein R^1 is defined above, or a suitable salt thereof, in the presence of a base in solvent 1, to form a compound of formula (IV)



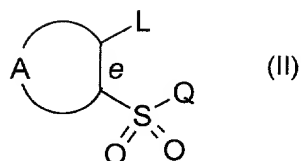
wherein A, L and X are as defined above, and

cyclizing the compound of formula (IV) in solvent 2, optionally in the presence of a base, and

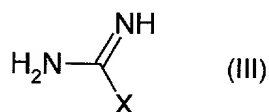
- 15 optionally with a metal catalyst, to form a compound of formula (I), or

- c) reacting a compound of formula (II)

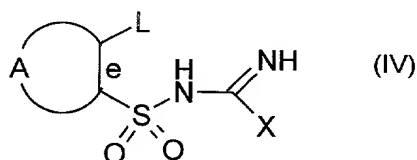
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wherein A is as defined above, L is a leaving group selected from alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl or halogen and Q is halogen, with a compound of formula (III),



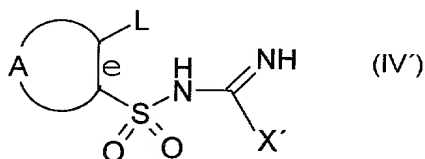
wherein X is OR¹, wherein R¹ is defined above, or a suitable salt thereof, in the presence of a
5 base in solvent 1, to form a compound of formula (IV)



wherein A, L and X are as defined above, and
cyclizing the compound of formula (IV) in solvent 2, optionally in the presence of a base, and
optionally with a metal catalyst, to form a compound of formula (I), or

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d) transforming a compound of formula (IV) to a compound of formula (IV')



wherein A, L and X are as defined above, and X is transformed into X', wherein X' is
selected from the groups defined for X, with the proviso that X' ≠ X, and

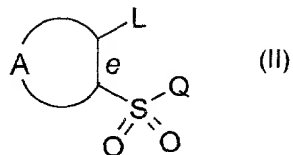
15 cyclizing the compound of formula (IV') in solvent 2, optionally in the presence of a base, and
optionally with a metal catalyst, to form a compound of formula (I), or

e) transforming a compound of formula (I), prepared as described above, by oxidation or
substitution or both, to form another compound of formula (I).

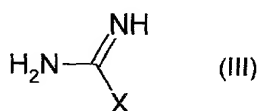
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2. A process according to claim 1 comprising:

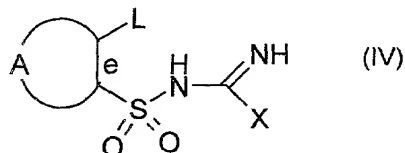
reacting a compound of formula (II)



5 wherein A is as defined above, L is a leaving group selected from alkoxy, alkylthio, alkyl-sulfinyl, alkylsulfonyl, nitro or halogen and Q is halogen, with a compound of formula (III)



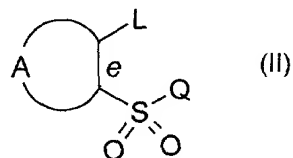
10 wherein X is NR^2R^3 , wherein R^2 and R^3 are defined above, or a suitable salt thereof, in the presence of a base in solvent 1, to form a compound of formula (IV)



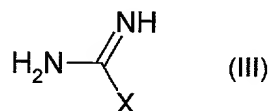
15 wherein A, L and X are as defined above, and cyclizing the compound of formula (IV) in solvent 2, optionally in the presence of a base, and optionally by treatment with a metal catalyst, to form a compound of formula (I).

3. A process according to claim 1 comprising:

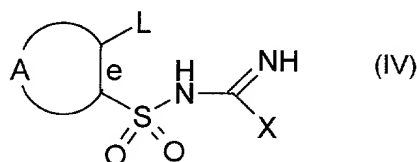
reacting a compound of formula (II)



wherein A is as defined above, L is a leaving group selected from alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, nitro or halogen and Q is halogen, with a compound of formula (III),



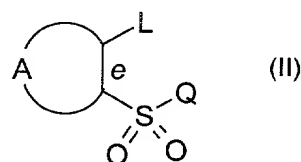
wherein X is SR^1 , $\text{S}(=\text{O})\text{R}^1$ or $\text{S}(=\text{O})_2\text{R}^1$, wherein R^1 is defined above, or a suitable salt thereof, in the presence of a base in solvent 1, to form a compound of formula (IV)



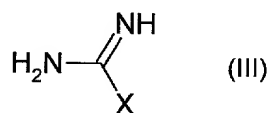
wherein A, L and X are as defined above, and cyclizing the compound of formula (IV) in solvent 2, optionally in the presence of a base and, optionally by treatment with a metal catalyst, to form a compound of formula (I).

4. A process according to claim 1 comprising:

reacting a compound of formula (II)

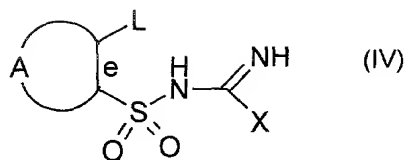


wherein A is as defined above, L is a leaving group selected from alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, nitro or halogen and Q is halogen, with a compound of formula (III),



wherein X is OR^1 , wherein R^1 is defined above, or a suitable salt thereof, in the presence of a base in solvent 1, to form a compound of formula (IV)

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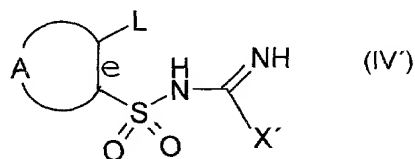


wherein A, L and X are as defined above, and

cyclizing the compound of formula (IV) in solvent 2, optionally in the presence of a base and, optionally by treatment with a metal catalyst, to form a compound of formula (I).

5 5. A process according to claim 1 comprising:

transforming a compound of formula (IV) into a compound of formula (IV')



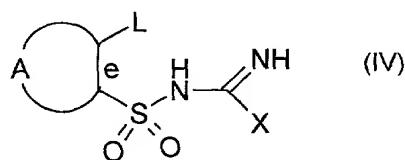
wherein A, L and X are as defined above, and X is transformed into X', wherein X' is

10 selected from the groups defined for X, with the proviso that $X' \neq X$, and

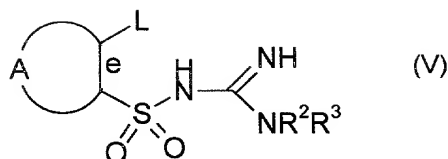
cyclizing the compound of formula (IV') in solvent 2, optionally in the presence of a base and, optionally by treatment with a metal catalyst, to form a compound of formula (I).

6. A process according to claim 1 comprising:

15 transforming a compound of formula (IV)



wherein A, and L are as defined above and X is SR^1 , $S(=O)R^1$ or $S(=O)_2R^1$, wherein R^1 is
20 defined above, into a compound of formula (V)



wherein A, L and R² and R³ are as defined above, and
cyclizing the compound of formula (V) in solvent 2, optionally in the presence of a base and,
optionally by treatment with a metal catalyst, to form a compound of formula (I).

7. A process according to claim 1, wherein the process further comprises cyclizing the compound of formula (IV) in solvent 2 in the presence of a base.
8. A process according to claim 1, wherein the process further comprises cyclizing the compound of formula (IV) in solvent 2 in the presence of a base and by treatment with a metal catalyst.
9. A process according to claim 1, wherein the process further comprises cyclizing the compound of formula (IV) in solvent 2 in the presence of a base and without a metal catalyst.
10. A process according claim 1, wherein the process further comprises cyclizing the compound of formula (IV) in solvent 2 without the presence of a base.
11. A process according to claim 1, wherein the process further comprises cyclizing the compound of formula (IV) in solvent 2 by treatment with a metal catalyst without the presence of a base.
12. A process according to claim 1, wherein the process further comprises cyclizing the compound of formula (IV) in solvent 2 without the presence of a base and without a metal catalyst.
13. A process according to claim 1, wherein the process further comprises transforming a compound of formula (I), prepared as described above, by oxidation or substitution or both, to form another compound of formula (I).
14. A process according to claim 1, wherein the base is selected from sodium hydroxide, potassium carbonate, cesium carbonate or potassium hydroxide.

15. A process according to claim 1, wherein solvent 1 is selected from diethyl ether, acetone, toluene or t-butyl-methyl ether.
16. A process according to claim 1, wherein solvent 2 is selected from *N,N*-dimethylformamide, toluene, xylene, 1-butanol, *N*-methyl-2-pyrrolidinone, sulfolane, dimethylsulfoxide, DMPU or water.
17. A process according to claim 1, wherein the metal catalyst is selected from copper bronze, copper oxide, copper chloride, copper bromide or copper iodide.
18. A compound selected from the group consisting of:
 3-Amino-6-chloro-4H-thieno[3,2-e]-1,2,4-thiadiazine 1,1-dioxide;
 7-Bromo-6-chloro-3-propylaminothieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide;
 7-Bromo-3-(*sec*-butylamino)-6-chloro-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide;
 7-Bromo-6-chloro-3-cyclobutylamino-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide;
 6-Chloro-3-methylsulfanyl-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide; or
 6-Chloro-3-methylsulfinyl-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide
 obtained by a process according to claim 1.
19. A compound selected from the group consisting of:
 6-Bromo-3-methylsulfanyl-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide; 6-Bromo-3-methylsulfinyl-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide; 3-Amino-6-bromo-4H-thieno[3,2-e]-1,2,4-thiadiazine 1,1-dioxide; 6-Chloro-3-ethylamino-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide;
 6-Chloro-3-propylamino-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide;
 3-Isopropylamino-6-methyl-4H-thieno[3,2-e]-1,2,4-thiadiazine 1,1-dioxide;
 6-Methyl-3-propylamino-4H-thieno[3,2-e]-1,2,4-thiadiazine 1,1-dioxide; or
 3-*sec*-Butylamino-6-methyl-4H-thieno[3,2-e]-1,2,4-thiadiazine 1,1-dioxide
 obtained by a process according to claim 1.
20. A pharmaceutical composition for the treatment or prophylaxis of Type I or Type II diabetes comprising a compound according to claim 18 and a pharmaceutically acceptable carrier.

21. A pharmaceutical composition for the treatment or prophylaxis of Type I or Type II diabetes comprising a compound according to claim 19 and a pharmaceutically acceptable carrier.
- 5 22. A method of treating Type I or Type II diabetes which comprises administering an effective or prophylactic amount of a compound according to claim 18 to a person suffering from Type I or Type II diabetes.
- 10 23. A method of treating Type I or Type II diabetes which comprises administering an effective or prophylactic amount of a compound according to claim 19 to a person suffering from Type I or Type II diabetes.

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